

1 **SKATE WHEELS INCORPORATING TRANSVERSE-**
2 **MOUNTED AND SELF-POWERED ILLUMINATING DEVICES**
3 **BACKGROUND OF THE INVENTION**

4 1. Field of the Invention

5 The present invention relates to a skate wheel incorporating transverse-
6 mounted and self-powered illuminating devices, particularly to a roller wheel
7 installable on in-line skates and skate boards that are equipped with transverse-
8 mounted illuminating devices and means of generating the necessary electricity
9 to supply the illuminating devices.

10 2. Description of Related Art

11 In-line skates and skate boards are sports items popular with teenagers,
12 as they are suitable for both leisure activities and exercise. By using the in-line
13 skates or skate boards to do difficult acts with advanced skills, teenagers find a
14 sense of accomplishment and a venue for self-expression. Therefore, many
15 skating fans like to wear sportive gear and clothing to show off their personal
16 styles, and install light or sound producing devices on the in-line skates or skate
17 boards. These in-line skates or skate boards, when in use, can produce the light
18 or sound effect to catch the attention of spectators. The in-line skate equipped
19 with illuminating devices is intended to amuse the crowds as the in-line skate can
20 produce a light trail following the movement of the skater.

21 Most illuminating devices are installed inside the roller wheels of in-line
22 skates or skate boards to produce the light as the wheels rotate on the axle. The
23 illuminating device is installed inside the wheel and perpendicular to the axis of
24 the wheel that means the illuminating device is radially mounted on the hub

1 extending towards the circumference of the wheel. When the skate is rolling, the
2 illuminating devices can be easily scratched against the ground or by other
3 obstacles causing abrasion on the surface of the illuminating devices. As a result,
4 light emission from the illuminating devices will be partially diffracted by the
5 uneven surface on the illuminating devices, thus the light is attenuated.

6 Further, since the conventional illuminating devices are protruded from
7 the hub, these illuminating devices cannot fit in wheels with a particularly small
8 diameter. Therefore, the conventional design of the illuminating devices is
9 hampering efforts to create wider applications.

10 SUMMARY OF THE INVENTION

11 The main object of the present invention is to provide a modified in-line
12 skate wheel that incorporates a transverse-mounted illuminating device. The
13 design of the illuminating device for installation in the transverse-orientation (1)
14 is able to reduce the diameter requirements on the wheel, (2) allows the light
15 produced by the illuminating device to irradiate from the lateral side of the wheel,
16 and (3) reduces the chance of scratching of the illuminating device, thus
17 preventing the diffraction of light to attenuate the light effect.

18 The second object of the present invention is to provide an illuminating
19 device that is embedded with means of generating the necessary electricity to
20 supply the illuminating device. Therefore, the illuminating device does not need
21 any external power source.

22 To this end, the skate wheel incorporating transverse-mounted and self-
23 powered illuminating device, comprises:

24 two opposing and mutually coupling anchors, with the second anchor

1 having a recessed portion on the side opposing the first anchor, such that when
2 the two anchors are mutually coupled a chamber is formed between the two
3 coupled anchors;

4 a ring-shaped rotor being placed in the chamber between the two
5 coupled anchors, which rotates synchronously with the motion of the coupled
6 anchors;

7 multiple illuminating devices being inserted on the rotor in transverse
8 orientation, wherein each illuminating device has two terminals, one terminal
9 being connected to the metal plate of the rotor and the other terminal being
10 connected to an induction coil;

11 a stator being fitted in the rotor, but not in physical contact with the
12 rotor;

13 an axle extending through the two coupled anchors and the stator being
14 secured with the axle; and

15 a protective covering, made of translucent materials, being placed
16 around the circumference of the two coupled anchors.

17 According to the present invention, multiple gaps are formed on each
18 metal plate of the rotor corresponding to the positions of illuminating devices for
19 accommodating the two terminals of the illuminating devices, and multiple open
20 slots are formed on one of the two anchors corresponding to the positions of
21 illuminating devices for receiving the illuminating devices to be installed on the
22 rotor.

23 According to the present invention, the rotor is formed by an induction
24 coil and two metal plates, wherein the induction coil is formed by a wire wound

1 around a circular core, the two metal plates are joined together holding the
2 induction coil in the middle of the two metal plates, and one end of the coil is
3 connected to the mutually coupled metal plates.

4 Since the illuminating device is installed in a transverse orientation in
5 relation to the upright anchors, the installed illuminating devices are embedded
6 in the rotor. Therefore, the diameter of the wheel can be reduced as compared
7 with conventional design of the illuminating devices, thus the present skate
8 wheel can be fitted on in-line skates and skate boards that use small wheels.
9 Further, the embedded design can prevent scratching of the illuminating devices
10 against the ground or by other foreign objects that would otherwise cause
11 abrasion on the surface of the illuminating device and attenuate the light effect.

12 Other objectives, advantages and novel features of the invention will
13 become more apparent from the following detailed description when taken in
14 conjunction with the accompanying drawings.

15 BRIEF DESCRIPTION OF THE DRAWINGS

16 Fig. 1 is a perspective view of the present invention;

17 Fig. 2 is an exploded diagram of the invention;

18 Fig. 3 is a cross-sectional view of the invention; and

19 Fig. 4 is a cross-sectional view of the in-line skate fitted with the wheels
20 of a preferred embodiment of the invention.

21 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

22 A preferred embodiment of the present invention will now be described
23 with reference to the accompanying drawings.

24 Fig. 1 presents an in-line skate wheel (10) incorporating transverse-

1 mounted and self-powered illuminating devices in accordance with the present
2 invention.

3 Figs. 2, 3 illustrate the structure of the present invention, including a first
4 and a second anchor (11)(12), a rotor (13) and a stator (14) held between the two
5 coupled anchors (11)(12), multiple illuminating devices (15) installed on the
6 rotor (13) in transverse orientation, an axle (17) extending through the two
7 coupled anchors (11)(12) and the stator (14), and a protective covering (18)
8 formed over the circumference of the two coupled anchors (11)(12).

9 The wheel (10) is mounted on the axle (17) of the in-line skate or skate
10 board, which is formed by two mutually coupled first and second anchors (11)
11 (12) , with the second anchor having a recessed portion on the side facing the
12 first anchor, such that when the two anchors (11) (12) are joined a chamber is
13 defined for accommodating the rotor (13) and the stator (14) in between the two
14 coupled anchors (11) (12).

15 The ring-shaped rotor (13) is formed by a ring-shaped induction coil and
16 two metal plates, wherein the induction coil is formed by a wire wound around a
17 circular core, and the two metal plates are joined together holding the induction
18 coil in the middle of the combined metal plates. The two metal plates are fixed
19 by welding, wherein a first end of the induction coil is directly and electrically
20 connected to the mutually coupled metal plates for boosting the efficiency of
21 power generation. The rotor (13) is able to rotate synchronously with the rotation
22 of the two coupled anchors (11) (12), wherein multiple gaps (132) are defined in
23 the two metal plates corresponding to the positions of illuminating devices (15)
24 for accommodating the illuminating devices (15), such that the terminals of the

1 transversely-installed illuminating devices (15) do not touch the metal plates;
2 and

3 multiple open slots (124) are formed on the second anchor (12)
4 corresponding to the positions of the illuminating devices for receiving the
5 illuminating devices (15) to be installed on the rotor (13) through the second
6 anchor (12).

7 The multiple illuminating devices (15) are installed on the rotor (13) in
8 transverse orientation, wherein each illuminating device (15) is inserted in a
9 respective one of the gaps (132) on the rotor (13) axially through a
10 corresponding open slot (124) on the second anchor (12). Each illuminating
11 device (15) may be a light emitting diode (LED) that has two terminals, with one
12 terminal being electrically fixed onto one of the two metal plates and the other
13 terminal being connected to a second end of the induction coil.

14 When the illuminating device (15) is lodged in the corresponding gap
15 (132) on the rotor (13), the terminals of the transversely-installed illuminating
16 devices (15) do not touch the coupled metal plates, and the corresponding open
17 slot (124) allows the illuminating device (15) to give out light penetrating the
18 anchor wall (12) and the protective covering (18) so that the light can be viewed
19 from the outside.

20 The stator (14) is fitted in the rotor (13), but not in physical contact with
21 the rotor (13), wherein the stator (14) is a ring-shaped permanent magnet.

22 The axle (17) is installed through the first and second anchors (11) (12)
23 and securely engaged with the stator (14), such that when the rotor (13)
24 synchronously rotates with the revolution of the wheel (10) the stator (14)

1 remains stationary.

2 Two bearing sleeves (16) (162) are lodged in respective notches formed
3 on the outer side of the first and second anchor (11) (12) opposite to the side
4 facing each other, allowing the axle to extend through the space in the middle of
5 the anchors (11)(12).

6 The protective covering (18) is formed on the circumference of two
7 coupled anchors (11) (12), wherein the protective covering (18) is made of
8 polyurethane material (PU) by injection molding covering the circumference
9 and the lateral sides of the first and second anchors (11) (12) and binding the
10 two anchors (11) (12) together.

11 Fig. 4 is a cross-sectional view of the in-line skate fitted with the wheels
12 of the present invention. When the in-line skate or skate board equipped with the
13 skate wheels (10) is put to use, the mutually coupled anchors (11) (12) and the
14 protective covering (18) start to rotate synchronously on the axle (17), causing
15 the rotor (13) to rotate synchronously as opposed to the stator (14), whereby the
16 induction coil of the rotor (13) cuts across the magnetic flux of the stator (14)
17 producing electric current that can light up the illuminating devices (15). The
18 light given out by the illuminating devices of in-line skates and skate boards can
19 chart a light trail following the action of the skater thus producing the animation
20 effect for the crowds.

21 With the illuminating device (15) positioned in the transverse
22 orientation against the mutually coupled anchors (11) (12), the light emitted by
23 the illuminating device (15) will be able to irradiate from the lateral side of the
24 protective covering (18), while the illuminating devices (15) are protected by the

1 protective covering (18) and the coupled anchors (11) (12). Therefore, the
2 present design of the skate wheels is able to prevent scratching of the
3 illuminating devices (15) against the ground or by foreign objects that otherwise
4 would cause abrasion on the surface of the illuminating device (15).

5 Furthermore, with the illuminating device (15) installed in transverse
6 orientation, the diameter and the size of the wheel (10) can be reduced in
7 comparison with the prior art. The skate wheel (10) can be used on in-line skates
8 and skate boards that use small wheels.

9 The foregoing description of the preferred embodiments of the
10 present invention is intended to be illustrative only and, under no
11 circumstances, should the scope of the present invention be so restricted,
12 and changes may be made in detail, especially in matters of shape, size, and
13 arrangement of parts within the principles of the invention to the full extent
14 indicated by the broad general meaning of the terms in which the appended
15 claims are expressed.